Aqwa vs SeaFEM vs WAMIT

ANSYS Aqwa Diffraction Wave Diffraction and Radiation	SeaFEM Wave Diffraction and Radiation	WAMIT Wave Diffraction and Radiation
3-D panel method	Time domain 3D Finite Element Method. There is no need of transferring from frequency domain to time domain.	3-D panel method.
1st order multi-body wave diffraction and radiation.	1st and 2nd order multi-body wave diffraction and radiation with regular waves and sea spectra.	1st order multi-body wave diffraction and radiation. 2nd order for bichromatic waves.
Forward speed.	Real forward speed with stream-line and SUPG integration.	Forward speed.
Full quadratic transfer function (QTF) calculation for slow drift effects.	Time domain 2nd order drift and non-linear hydrostatics.	Full quadratic transfer function (QTF) calculation for slow drift effects.
Simulation of mooring and physical connections through user-defined stiffness matrix.	Simulation of mooring and physical connections between bodies; rotation, line and plane constraints, rotation and translation links, and rigid body, ball, revolute, cylindrical and prismatic joints.	Simulation of mooring and physical connections through user-defined stiffness and damping matrix.
	Seakeeping, towing in still water and (spectral) waves, maneuvering, response in waves with currents, extinction tests, and RAOs from white noise analysis.	
	Hydrodinamic loads on lines (auxiliary wireframe) are calculated using an extended form of Morison's equation.	
	Regular and irregular (spectral) waves, including white noise, Pierson-Moskowitz, JONSWAP and user-defined spectrum.	
	Bathymetry: infinite depth, constant depth and irregular seabed.	

Wave Diffraction and Radiation + Structural Suite

ANSYS AQWA Suite Analysis Options	Tdyn-SeaFEM Suite Analysis Options	WAMIT Analysis Options
Static and dynamic stability, mean equilibrium position for multi-body assemblies.	Seakeeping, towing in still water and (spectral) waves, maneuvering, response in waves with currents, extinction tests, and RAOs from white noise analysis.	Seakeeping analysis, added mass and damping and RAOS.
Frequency-domain solution of significant and extreme linear response due to first-order wave and second-order, slowly varying drift effects.	First and second order time-domain solution of significant linear and non-linear response for 6 dofs.	Linear frequency-domain analysis plus second order correction in bichromatic and bidirectional waves.
Time-domain simulation of extreme wave conditions including nonlinear hydrodynamic effects resulting from the variable wetted surface.	Time-domain simulation including nonlinear hydrodynamic effects, transom stern flows, and variable wetted surfaces.	F2T utility to transform first-order frequency-domain outputs to time-domain impulse response functions.
	Seamless communication of the hydrodynamic forces to the structure. A unique hydroelasticity analysis GUI allows performing structure-waves interaction studies for strength assessment of the design.	

Computation and utilization of full quadratic transfer function (QTF) matrices for slow drift effects, including both sum and difference frequency components.	First and second order hydrodynamic forces and moments are obtained from pressure integration over the body, accounting from waves, currents, diffraction and radiation.	Mean drift forces and moments on structures are evaluated from the momentum flux through a control surface surrounding each structure.
Fully coupled cable dynamic feature enabling mooring line drag and inertial characteristics to be included in the vessel motions analysis.	Build-in dynamic FEM cable model enabling mooring line drag and inertial characteristics to be included in the motions analysis. User-defined stiffness and damping matrixes.	Simulation of mooring and physical connections through user-defined stiffness matrix.
	Non-linear pressure boundary conditions on free surface. Capable of modeling air cushion vehicles and oscillating water column devices with power take-off assessment.	Pressure boundary conditions on free surface.
	Non-linear free surface height limit condition (dry body effect).	
	Advanced Tcl programming interface, enabling enhance simulations and execution / communication with external programs.	
	Cutting-edge deflated CG solvers and direct sparse solvers. CUDA GPU acceleration available.	Parallel processing can be used on PC's.

Environmental Loading	Environmental Loading	Environmental Loading
Constant wind and current, including current profile.	Constant wind and current. Flow field updated every time step calculation for stream-line or SUPG integration.	
Regular and irregular (spectral) waves.	Regular and irregular (spectral) waves, including white noise, Pierson-Moskowitz and JONSWAP. User defined spectrum available as well.	Bichromatic and bidirectional waves.
Wave surface time history.	User defined spectrum.	
Wind time history, wind spectrum.	Fully flexible linear and nonlinear forces using analytical or discrete functions.	
	User defined directional wave energy distribution.	

Mooring Capabilities	Mooring Capabilities	Mooring Capabilities
Linear elastic lines, Intermediate pulleys, Linear drum winches, General nonlinear polynomial, Constant force lines.	Fully flexible linear and nonlinear links, including rotation, line and plane constraints. User-defined stiffness and damping matrixes.	Simulation of mooring and physical connections through user-defined stiffness and damping matrix.
Quasi-static or dynamic catenaries, multi-segment composite catenary, non-linear composite catenary.	Build-in multi-segment quasi-static non-linear elastic catenary and dynamic finite element cable model.	
Thrusters, Fixed or floating fenders, Intermediate buoys and clump weights and Line break.	Fully flexible definition of linear and nonlinear forces using analytical or discrete functions. User-defined added mass, stiffness and damping matrixes.	
Physical connections between two or more vessels or to ground.	Physical connections between two or more vessels or to ground.	